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ABSTRACT

A study was conducted at Walters State Community College (WSCC) using a "base rate" approach to evaluate developmental mathematics and English courses. The study involved the collection of data on students' success rates in developmental courses and later in college-level courses; on developmental students' success rates compared with those of non-developmental students; and on the relationship of developmental and college-level course grades. Data for fall 1977 through winter 1979 were used as an initial base rate against which data from three subsequent six-quarter periods were compared. The study revealed: (1) during the base rate period, 62% of the students enrolled in developmental mathematics and developmental writing courses passed with a C or better; (2) in subsequent periods, C grades or higher were achieved by 57% (1978-80), 63% (1979-81), and 64% (1980-82) of the mathematics students; (3) of the successful developmental writing students who later enrolled in English Composition, 70% passed the college-level course in 1977-80, compared to 59% in 1978-80, 71% in 1979-81, and 60% in 1980-82; (5) of the successful developmental math students who later enrolled in Math Analysis, approximately 75% passed the college-level course in each six-quarter period; and (6) the grade distribution of former developmental students compared favorably with the overall grade distribution in both English and Math college-level courses. (DAB)

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A BASE RATE APPROACH TO EVALUATING DEVELOPMENTAL MATHEMATICS AND ENGLISH COURSES AT A COMMUNITY COLLEGE

by
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April 1, 1983

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Introduction

The purposes of this paper are to present (a) an approach to evaluating developmental mathematics and English courses, (b) the results obtained from the approach, and (c) the effects of the results at Walters State Community College in Morristown, Tennessee. The aim of the paper is to suggest, by example, that some information profitable for decision making about developmental courses is relatively accessible at most institutions even with limited time and money budgeted for evaluation. The ideal evaluation according to Scriven (1977) is very complex, expensive and demanding of time, effort, and expertise. However, he admits that such thorough evaluations will be rare because of their costliness. This paper describes an evaluation project carried out on a limited scale which was of value to teachers and administrators.

Perspective or Theoretical Framework

The term, "evaluation", as used in this paper means "the collection and use of information to make decisions about an educational program (Cronbach, p. 319)". The paper makes the distinction between the "goal" of evaluation, to gather data to answer questions, and the "role" of evaluation, the use

to which the evaluation will be put (Scriven, p. 335).

The "base rate" approach illustrated in the paper differs from a technique often used to evaluate developmental programs in which a group of high-risk students enrolled in developmental studies is compared with a similar group of students not not enrolled in developmental studies. (Roueche & Kirk, 1973). The term, "base rate", arises from Cronbach's statement that a "follow-up study ... has very little meaning unless outcomes can be compared with some sort of base rate (Cronbach, p. 326)".

Procedures

The "base rate" approach illustrated in this paper involves collecting data on certain variables; for example, the rate of success of former developmental students in subsequent college courses. These data are used as a base rate against which similar data are compared from subsequent periods of time. A specific example will serve to clarify the base rate approach. Information was desired on success of students who completed a developmental mathematics course and then took a regular college level mathematics course. Data were collected on all developmental mathematics students

who completed a developmental mathematics course successfully (C grade or better) and then enrolled in a college level mathematics course for which the developmental course was designed to prepare students. The data were collected for a period of six quarters and tabulated. The period of six quarters was selected to allow students time to enroll in and complete the college level mathematics course. Some analysis of this data was possible. However, the primary use of this data came after a second set of data covering a comparable period of six quarters was obtained. The first set of data provided a base rate against which the second set of data was compared. As each succeeding set of data becomes available, it is possible to look for trends, both changes in rates and rates which remain stable. Each data set, then, serves as a replication.

There are several justifications for choosing a "base rate" approach to evaluation. Community college students tend to interrupt and resume their studies one or more times. For example, the percent of students who were enrolled at Walters State in Fall, 1978, but did not enroll in the subsequent quarter of Winter, 1979 was 30%. Some of those students who dropped out will drop in again as work, family and financial responsibilities permit. This tendency of

students (not just developmental students) to drop out and drop in to college weakens some follow up assessments. The effectiveness of developmental studies programs in salvaging students has been assessed by examining the proportion of developmental students who persist in coursework after a certain number of quarters. The salvage rate may appear lower than it really is because some students may drop back into college and succeed after the salvage rate has been calculated. Similarly, a commonly used technique of matching developmental students with similar students not enrolled in developmental courses to evaluate the effect of developmental courses on student success in later quarters is made less effective by this mortality of subjects. In the base rate approach chosen for this study, a period of six quarters is examined. During that time, students may drop out and drop in and still be tabulated. Thus the base rate approach is less affected by drop outs.

It should be noted that the base rate approach does not answer what Losak (1973) considers to be the essential question, "Does the program or course provide greater success for students than would occur if no special courses or programs were available? (p. 43)". He maintains that without rigorous evaluation to establish that the

> remedial course or program does offer benefits, it is immoral to delay the student's educational progress by enrolling him in courses for which he often does not receive credit from his own college and for which he rarely receives credit from senior colleges. (p. 44)

Therefore, in his opinion, developmental programs must evaluate using a design involving a control group of students who would normally be in a developmental course, but have been assigned to a regular course. In the opinion of the writer of this paper, such research is not practical. At Walters State, students voluntarily enroll in developmental studies courses based on their self-assessment or the advice of a counselor. To create a control group, one would have to deny access to developmental courses to randomly selected students after they had indicated a desire to enroll in a developmental course.

Data Source

The data were gathered at Walters State Community College from the computerized student data base. The initial base rate covers six quarters from Fall, 1977 through Winter, 1979. The three sets of comparison data each covers six quarters from Fall, 1978 through Winter, 1980, from Fall, 1979 through Winter, 1981, and from Fall, 1980 through Winter, 1982. There is some overlap in the data. A student who completes

developmental mathematics in a fall quarter and college level mathematics in a winter quarter will contribute to the data in two data sets. However, it was felt that the rates being compared are still interpretable because this overlap is small in comparison to the overall data. The nature of the student data base and computer access to the data base makes it prohibitively difficult to eliminate the overlap.

Results

The goal of the evaluation was to answer questions about developmental writing courses, DVS 0510, 0520, and 0530 as well as the last two courses in a developmental mathematics sequence, DVS 0720 and 0730. The content of the two mathematics courses is high school algebra. The data were examined to answer the following questions:

(a) At what rate are students successfully completing developmental courses;

(b) What is the rate of success in a college level course for students who successfully complete a developmental course;

(c) How does the rate of success of developmental students in college level courses compare to the rate of success of all students in the college

level courses;

and (d) On the average, what grade does an A developmental student receive in a college level course - what grade does a B developmental student receive, and so forth.

Each question and the data examined for it follow :

At what rate are students successfully completing developmental courses?

A grade of a C or better in Developmental Writing is supposed to indicate that the student can continue upon teacher recommendation to college level English Composition (ENG 1010). In Table 1, for the base rate period of Fall, 1977 through Winter, 1979, 24%, 16% and 22% of the Developmental Writing students received A, B or C grades, respectively. The total percentage of students in this category was 62%. The total percentages of students receiving C or better grades for the subsequent three time periods were 57%, 63% and 64%. The four rates appear relatively stable and indicate that about two out of three students enrolled in Developmental Writing can be salvaged to continue on to college level English.

Table 1
Percentages of Assigned Grades in Writing
DVS 0510 - 0520 - 0530

	A	B	C	D	F	Other	
77-79	4	22	36	10	8	19	n=229
78-80	3	15	38	12	11	20	n=247
79-81	3	20	41	10	13	14	n=207
80-82	7	28	29	9	15	10	n=363

Table 2
Percentages of Assigned Grades in Algebra
DVS 0720 - 0730

	A	B	C	D	F	Other	
77-79	24	16	22	3	13	22	n=213
78-80	22	15	14	13	12	24	n=138
79-81	36	16	11	2	14	21	n=377
80-82	31	18	12	5	16	19	n=633

Similarly, for Developmental Algebra, it appears that about 60% of the students receive C or better grades (Table 2). During the base rate period of Fall, 1977 through Winter, 1979, 24%, 16% and 22% of the algebra students received A, B or C grades respectively for a total percentage of 62%. Similar rates of 51%, 63% and 61% of C or better grades were obtained in the subsequent data collection periods.

What is the rate of success in a college-level course for students who successfully complete a developmental course?

Follow up data were collected on Developmental Writing students who earned a C or better and then enrolled in English Composition (ENG 1010). During the first data collection period, 70% of those students passed English Composition. This figure is the sum of the A, B, C, and D grades in Table 3. There is some variability in the pass rates for successive time periods with rates of 59%, 71% and 60%.

Table 3
Percentages of Grades in ENG 1010 Assigned to C or above Developmental Writing Students

	A	B	C	D	F	Other	
77-79	0	9	43	18	9	21	n=77
78-80	0	19	31	9	14	27	n=64
79-81	0	0	45	26	10	19	n=31
80-82	0	7	41	18	17	17	n=71

A closer examination was made of the pass rates in ENG 1010 of Developmental Writing students. There had been some divisional concern over a practice of referring students to Developmental Writing from English Composition and of

allowing students to maintain concurrent enrollment. The concurrent enrollment was seen as a means of encouraging students to accept the referral to Developmental Writing to which some students attach a stigma. However, it was felt that such students did not do well in either of the two courses. Therefore, the data for former developmental students enrolled in English Composition were broken down for the next three data collection periods into students concurrently enrolled in Writing and Composition and students who completed Writing prior to Composition. It was found that the majority of the concurrently enrolled students failed to complete Writing with a C or better, and they did noticeably less well in Composition that quarter except in 1979-1981 as is shown in Table 4.

Table 4
Percentages of C or above Developmental Writing Students Who Passed English 1010

	ENG 1010 After DVS	ENG 1010 Concurrent with DVS
78-80	66%	45%
79-81	71%	71%
80-82	74%	36%

Follow up data were collected on Developmental Algebra students who earned a C or better and then enrolled in Math Analysis (MAT 1310). During the first data collection period 77% of the students who left Algebra after either the first (DVS 0720) or second quarter (DVS 0730) passed Math Analysis. The sums of the first four columns in Table 5 are 78%, 74% and 79% indicating that about three-quarters of the developmental students pass the college-level mathematics class.

Table 5
Percentages of Grades in MAT 1310 Assigned to C or Above Developmental Algebra Students

	A	B	C	D	F	Other	
77-79	10	27	27	13	10	13	n=30
78-80	22	25	20	12	10	12	n=65
79-81	12	26	16	21	14	12	n=43
80-82	17	16	25	21	10	12	n=103

The adoption of a harder text in Math Analysis, one which required more algebra, led to the redesigning and reemphasis of the second quarter of Algebra (DVS 0730). Therefore, the data for former developmental students enrolled in Math Analysis were broken down into students who completed first quarter only and those who completed second quarter algebra.

As is indicated in Table 6, students who complete DVS 0730 have a better change of passing MAT 1310 than those who complete only DVS 0720.

Table 6
Percentages of C or Above Developmental Algebra Students Who Passed MAT 1310

	Completed DVS 0730	Completed DVS 0720 Only
78-80	100%	66%
79-81	75%	74%
80-82	81%	78%

How does the rate of success of developmental students in college level courses compare to the rate of success of all students in the college level courses?

Since the definition of success of former developmental students depends upon the grades received in English Composition and Math Analysis, the grade distributions for all students enrolled in the two courses were examined for the different data collection periods and were compared with the grade distributions for the former developmental students enrolled in those courses. In general, there was no grade inflation in English Composition and Math Analysis from one data period to the next. The grade distributions of former

Developmental Writing students who completed Writing with a C or above prior to enrolling in Composition compare favorably to the overall Composition grade distribution (Table 7). The writing student has about the same or a slightly better chance of passing Composition when compared to all students who take the course.

Likewise, there has been no grade inflation in Math Analysis grades, and the grade distribution of former Developmental Algebra students compares favorably to the overall grade distribution in Math Analysis (Table 8). Specifically, the former developmental student from either second quarter or first quarter Algebra has a better chance of passing Math Analysis when compared to all students who take the course.

Table 7
Pass Percentage Rates for All ENG 1010 Students and for Former DVS Students

	All ENG 1010 Students	C or Above DVS Writing Students
77-79	73%	—
78-80	69%	66%
79-81	68%	71%
80-82	70%	74%

Table 8
Pass Percentage Rates for All MAT 1310
Students and for Former DVS Students

	All MAT 1310 Students	Completed DVS 0730	Completed DVS 0720 Only
77-79	69%	—	—
78-80	67%	100%	66%
79-81	68%	75%	74%
80-82	62%	81%	78%

On the average, what grade does an A developmental student receive in a college level course - what grade does a B developmental student receive, and so forth.

Space limitations preclude reporting data from the four data collection periods. However, for the 77-79 period, the average change in grade when a developmental student goes on to English Composition or Math Analysis ranges from no change to a drop of a grade and a half (-1.60)(Table 9).

Discussion

The role the evaluation has played at Walters State is unique to the institution. However, since developmental programs face some of the same pressures for justifying their

Table 9
Average Grade Change when Developmental
Students Go On to MAT 1310 and ENG 1010

DVS 730	MAT 1310	Difference
4.0	3.15	-.85
3.0	3.0	0.00
2.0	1.8	-.20
DVS 720	MAY 1310	
4.0	2.58	-1.42
3.0	1.63	-1.37
2.0	.75	-1.25
DVS 0510-520-530	ENG 1010	
4.0	2.4	-1.60
3.0	1.82	-1.18
2.0	1.4	- .60

existences at other institutions, this paper reports the results of the evaluation. One of the results was to give feedback to the administration and to faculty and counselors who refer students to developmental courses. A developmental mathematics course was redesigned and reemphasized to draw more students when use was made of the data to support the need for the course. A policy of allowing concurrent enroll-

ment in developmental English and college level Composition was called into question when analysis of the data revealed that most of the concurrently enrolled students failed to complete either the developmental or college level course successfully. Some of the evaluation results were used to encourage students both to enroll in developmental courses and to persist in the courses until they reach a proficiency level sufficient to ensure success in college level courses. Thus, the results of the evaluation have been useful to administrators, faculty, and students.

Educational Importance of the Study

The paper presents an application of some evaluation techniques to developmental courses that have been of practical use to teachers and administrators in one setting. These techniques are one approach to examining how well developmental courses prepare students for regular college level courses.

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